Vacuum cleaner

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A vacuum cleaner, also known as a sweeper and hoover is a device that uses an air pump to create a partial vacuum to suck up dust and dirt, usually from floors, and from other surfaces.

The dirt/dust is collected by a dustbag for later disposal.

Vacuum cleaners exist in a variety of sizes and models which are used in homes as well as in industry:

i) small battery-powered hand-held devices,

ii) wheeled canister models for home use,

iii) domestic central vacuum cleaners,

iv) huge stationary industrial appliances that can handle several hundred litres of dust before being emptied, and

v) vacuum trucks for recovery of large spills or removal of contaminated soil.
Invention and History of Vacuum Cleaners:

- The vacuum cleaner evolved from the carpet sweeper via manual vacuum cleaners. The first attempts to provide a mechanical solution to floor cleaning were begun in England in 1599.
- On June 8, 1869, Chicago inventor, Ives McGaffey patented a "sweeping machine". This was the first patent for a device that cleaned rugs, however, it was not a motorized vacuum cleaner. It was the first hand-pumped vacuum cleaner.
- John Thurman invented gasoline-powered vacuum cleaner in 1899 and some historians consider it the first motorized vacuum cleaner.
- British engineer, Hubert Cecil Booth patented a motorized vacuum cleaner on August 30, 1901. Booth first demonstrated his vacuuming device that successfully sucked dirt.

*These early versions of vacuum cleaners were bulky, noisy, smelly, and unsuccessful.*

- The first vacuum-cleaning device to be portable and marketed at the domestic market was built in 1905 by Walter Griffiths, a manufacturer in Birmingham, England.
- In 1907, James Murray Spangler (1848-1915) of Canton, Ohio invented the first portable electric vacuum cleaner.
William Henry Hoover had Spangler's machine redesigned and had subsequent innovations included disposal filter bags in the 1920s, and an upright vacuum cleaner in 1926.

The last decades of the 20th century saw the more widespread use of technologies developed earlier, including filterless cyclonic dirt separation, central vacuum systems and rechargeable hand-held vacuums.

Miniaturized computer technology and improved batteries allowed the development of a new type of machine — the autonomous robotic vacuum cleaner.

**Types of vacuum cleaners:**

**Upright**

- Upright vacuum cleaners take the form of a cleaning head, onto which a handle and bag are attached. Upright designs generally employ a rotating brushroll or beater bar, which removes dirt through a combination of sweeping and vibration.
Drum
- Drum models are essentially heavy-duty industrial versions of cylinder vacuum cleaners, where the canister consists of a large vertically positioned drum which can be stationary or on wheels.

Wet/dry
- Wet or wet/dry vacuum cleaners are a specialized form of the cylinder/drum models that can be used to clean up wet or liquid spills.

Hand-held
Lightweight hand-held vacuum cleaners, either powered from rechargeable batteries or mains power, are also popular for cleaning up smaller spills. Frequently seen examples include the Black & Decker DustBuster, which was introduced in 1979, and numerous handheld models by Dirt Devil, which were first introduced in 1984.

Robotic
In the late 1990s and early 2000s, several companies developed robotic vacuum cleaners, a form of carpet sweeper usually equipped with limited suction power. It uses a rotating laser-based range-finder to scan and map
Components of vacuum cleaner:

The conventional vacuum cleaner is actually made up of only six essential components:
1. An intake port, which may include a variety of cleaning accessories
2. An exhaust port
3. An electric motor
4. A fan
5. A porous bag
6. A housing that contains all the other components
How vacuum cleaners work:

- The electric current operates the motor. The motor is attached to the fan, which has angled blades (like an airplane propeller).
- As the fan blades turn, they force air forward, toward the exhaust port.
- When air particles are driven forward, the density of particles (and therefore the air pressure) increases in front of the fan and decreases behind the fan.
- This pressure drop behind the fan is just like the pressure drop in the straw when you sip from your drink. The pressure level in the area behind the fan drops below the pressure level outside the vacuum cleaner (the ambient air pressure). This creates suction, a partial vacuum, inside the vacuum cleaner. The suction pulls debris into the intake of the vacuum cleaner and further into the filter bag.

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[Diagram showing the flow of air through a vacuum cleaner, from motor, fan, and filter bag to intake and exhaust ports.]

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Care and maintenance:

- When not in use, unplug the vacuum cleaner from the wall outlet.
- Most commercial vacuum cleaners are not intended for outdoor use. Store and use them only indoors.
- Never vacuum a wet surface. This can damage the motor and puts the user at risk for electrical shock.
- Never pull a vacuum cleaner by its cord.
- Do not clean up toxic or flammable materials with a vacuum cleaner.
- Do not pick up hard or sharp objects, including glass, nails, screws, coins, etc., with the machine.
Thank you